

Environmental Pollution Prevention Opportunity Assessments for the Hospitality Industry



A Report for the Virginia Department of
Environmental Quality as part of the
Green Lodging program



Green Seal, Inc.
Washington, DC

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Case Studies of Four Participants in the Virginia *Green Lodging* Program
A report by Green Seal to the Virginia Department of Environmental Quality

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Background

Funded by a contract from the Virginia Department of Environmental Quality, Green Seal examined four lodging properties in Virginia with the intent of documenting the environmentally responsible initiatives currently in place and identifying pollution prevention opportunities for both economic and environmental savings. The four properties included a 6-room bed and breakfast (Llewellyn Lodge), a mountain resort (Wintergreen Resort), and two conference centers located in urban areas (Williamsburg Hospitality House & Conference Center, and The Hotel Roanoke).

These four properties have made significant, cost-effective environmental improvements in numerous areas of their operations, yet only two are actively publicizing their efforts. The Llewellyn Lodge and the Wintergreen Resort are promoting some of their environmental actions and their participation in the Virginia *Green Lodging* program. Guests and meeting planners alike who are looking for a “green” hotel for business travel, leisure travel, or conference venues need to be informed of a property’s efforts to be environmentally responsible. In addition, guests who select a property for other reasons may be more inclined to repeat business due to the “green” aspect of the hotel.

Overall, the four properties were very aware of the major mechanical systems (HVAC, lighting, water) throughout their property, since these systems represent large portions of their utility spending. One property had taken advantage of utility audits for water and energy use, and they all wanted to participate in this audit in the hopes of finding more ways to both save money and reduce their environmental impacts through pollution prevention or other opportunities. In the case of HVAC equipment, these properties were making the most of their existing equipment by upgrading parts (e.g., burners) where possible, regular preventive maintenance, and intensively tracking energy use and guest comfort through either staff observation or energy management systems. The greatest opportunity for energy efficiency improvement comes when major equipment needs to be replaced, but in the interim, making the most of existing equipment saves energy and helps avoid major unexpected system repairs.

Recycling, although one of the larger activities frequently associated with “green” programs, was hindered in 3 of the 4 properties by a lack of local infrastructure. With the exception of the Wintergreen Resort, which installed bins and collection areas on their own, two properties are currently only recycling cardboard and the third must take any collected recyclables to a collection area since there is no local or curbside pickup. Although there are clear environmental benefits to recycling and usually a reduction in waste volume results, if recyclables are not a commodity locally, then collecting them does not make much sense. For all green hotels in today’s business climate, environmental initiatives must be cost-effective first and foremost.

Cleaning products for laundry and housekeeping represent another pollution prevention opportunity for these properties. The three larger properties are using concentrated products that are diluted on site, and two of them are using dispensing stations which make the dilution process easier and less prone to spills. The bed and breakfast is using ready-to-use products

bought locally due to the size of the property. For the larger properties, a quick review as part of this audit showed that both the laundry chemicals and housekeeping cleaners being used have some less than desirable ingredients. These ingredients include moderate and severe skin and eye irritants – an important consideration for employees using these products on a daily basis, neurotoxicants, respiratory toxicants, endocrine disruptors, ingredients which do not readily biodegrade, and a large presence of chlorine and chlorine derivatives. Alternative products are available in many instances with reduced environmental impacts and reduced toxicity, but specific product recommendations are beyond this audit. These properties can, however, work with their current suppliers and vendors to make sure they are purchasing the “greenest” options within their offerings. The properties can also ensure that the staffs who work with these products have received the proper training in their handling and use.

All of the properties are currently using individually packaged guest amenities. A switch to counter and wall-mounted dispensers would yield a quick payback. For most individually packaged amenities, roughly 80% of the cost of the amenity is the cost of the packaging. Switching to a dispenser system can reduce the cost per amenity per guest from approximately \$0.25 per amenity to \$0.13 per amenity use. Housekeeping staffs will also spend less time setting up a room (one estimate is 4-minutes less per room), as the locking dispensers only need refilling every few weeks. Dispensers can have a payback as short as six months, and are available from several vendors (e.g., Guest Solutions, Better Living Products). The products themselves (e.g., shampoo, conditioner, soap) may be available in bulk one gallon or larger containers from current vendors, and many brand names, such as Neutrogena and Bath & Body Works, are available in bulk form.

WILLIAMSBURG HOSPITALITY HOUSE & CONFERENCE CENTER



Located in historic Williamsburg, Virginia, the Williamsburg Hospitality House & Conference Center is a 296-room property adjacent to Colonial Williamsburg and the campus of the College of William and Mary.

HVAC and Lighting

Current Initiatives: boiler was converted from oil to natural gas and burners have been upgraded to high-efficiency

burners; timers used for lighting in closets and storage areas; exit signs are being replaced with models that illuminate only when the power goes off; chillers were replaced with new higher efficiency models; cooling towers were rebuilt two years ago; compact fluorescent wall sconces in most of the hallways.

Opportunity: Approximately 45-recessed canister fixtures in lobby with 65-watt incandescent bulbs that run 24-hours per day. Replacing with 20-watt compact fluorescent floodlights would yield a savings of at least \$711 annually and would save 394-kWh, nearly enough to run a home refrigerator/freezer for one year.

Changing over to compact fluorescent fixtures would also yield savings from:

- maintenance staff not changing 315 light bulbs
- less heat generated into the lobby area and less cooling required in the warm months
- avoided storage and disposal of 315 light bulbs

Water Use and Laundry

Current Initiatives: low-flow faucet aerators and showerheads in use; lower-flow toilets (3-½ gallons per flush) in use; dishwashers re-circulate cycle water; preventive maintenance of drips/leaks; water-efficient washers (reuse of filter wash water); energy-efficient dryers; linen segregation (wash using gentle cycle for lightly soiled); all linens except 100% cotton items washed in cold water.

Opportunity: replace 296-older toilets with 1.6 gallons per flush models, which would yield annual savings of 307,914 gallons of water and \$1,163.

Maintenance and Housekeeping

Current Initiatives: inventory tracking so that oldest products are used first; property is eliminating use of aerosols; use of latex paints throughout property except for existing alkyd paint in lobby; minimizing use of HVAC/cooling tower water treatment chemicals through magnetic or ionic-flux mechanisms; reusing cooling tower water as much as possible; furniture is refinished on-site rather than replaced; recycling cardboard and scrap metal; preventative maintenance of vehicles/equipment; effective systems of storage, labeling, and handling products; policy to use "dry" clean-up methods (versus using spray water).

Purchasing and Front Office

Current Initiatives: energy-efficient equipment in place (TV's/refrigerators/hair-dryers/irons/vehicles); extensive use of electronic documents/records; utilizing purchasing power to prescribe minimized packaging wastes (shrink-wrapping, excessive packaging) or requiring

that vendors take back packaging; pallets returned to vendors or taken by employees; sheets and towels that have been replaced donated to charity; carpets have recycled content and no-VOC's (volatile organic compounds); use of some reused building materials.

Opportunity: purchase facial tissue, paper towels and bath tissue with recycled content.

- Switching to a minimum 20% postconsumer content bath tissue would save 0.8 tons of virgin paper, 9.6 trees, 3,280 kWh of electricity, 5,600 gallons of water and 48-lbs. of air pollutants annually.
- Switching to a minimum 10% postconsumer content facial tissue would save 0.4 tons of virgin paper, 4.8 trees, 1,640 kWh of electricity, 2,800 gallons of water and 24-lbs. of air pollutants annually.

Rooms

Current Initiatives: sheets changed every other day for multiple night guests; reusable glasses/mugs provided in rooms; efficient HVAC with individual thermostats; optional free newspapers; housekeeping staff uses one general-purpose cleaner for daily cleaning – stronger chemicals are used sparingly by floor supervisors.

Foodservice and Meetings

Current Initiatives: glasses, silverware, cloth napkins used for foodservice and meetings; food inventory management and bulk purchasing; kitchen grease recycling.

Opportunity: begin collecting and recycling approximately 2,000 aluminum cans per month from food and beverage operations. At \$0.23 per pound, aluminum recycling can generate \$14 per month and save the energy equivalent of 125 gallons of gas per month.

Landscaping

Current Initiatives: sprinklers run at night; well water used for irrigation; outside company handles plantings; use of integrated pest management, organic fertilizers and efficiently timed applications; abundance of indoor plants.

Tissue Savings Calculations for Williamsburg Hospitality House:

- Assuming 75% annual average occupancy, 296-rooms * 365-nights * 0.75 occupancy = 81,030 room nights per year.
- Assume 1-roll bath tissue consumed every 4-room nights and 1-box facial tissue consumed every 4-room nights = 20,257 rolls bath tissue, 20,257 boxes facial tissue, 20,257 rolls bath tissue * 0.40 lbs./roll = 8103 lbs. = 4-tons of bath tissue used per year
20,257 boxes facial tissue * 0.40 lbs./box = 8,103 lbs. = 4 tons of facial tissue used per year

Based on the assumption that 1-ton of newsprint uses 12-trees and that every ton of recycled paper saves 4,100 kWh of electricity, 7,000 gallons of water, and 60-lbs. of air pollutants.

Energy Savings Calculation for Williamsburg Hospitality House:

- One 20-watt compact fluorescent floodlight w/ 8000 hour lifetime = \$15
- Electricity cost = 20 watts X 8000 hours / 1000 watts/kWh X \$0.08 /kWh = \$12.80
Total cost for 8,000 hours of light = \$27.80
- Eight 65-watt incandescent bulbs with 1,000 hour lifetime = 8 X \$0.25 = \$2.00
electricity cost = 65 watts X 8000 hours/1,000 watts/kWh X \$0.08 /kWh = \$41.60

Total cost for 8,000 hours of light = \$43.60

For 8,000 hours of light using a compact fluorescent in the lobby lights = \$15.80 per fixture or \$711 for all 45-lobby lights.

Water Savings Calculation for Williamsburg Hospitality House:

- 296-rooms with 3-½ gallons per flush toilets. Assuming 75% average annual occupancy and two flushes per day per occupied room, 296-rooms * 365-nights * 0.75 occupancy = 81,030 room nights per year * 2 flushes @ 3.5 gallons per flush = 567,210 gallons per year

Replacing with 1.6 gallons per flush toilets would mean annual use of 259,296 gallons, savings of 307,914 gallons per year, 307,914 gallons is 411 HCF (100 cubic feet of water equals 750 gallons), at \$1.21 per HCF for water and \$1.62 per HCF for sewer rates, \$1,163 dollars would be saved annually.

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WINTERGREEN RESORT

Covering 11,000 acres along the eastern slopes of Virginia's Blue Ridge Mountains and with 300+ rooms, Wintergreen is known for its skiing, golf, and tennis programs and other recreational activities.



HVAC and Lighting

Current Initiatives: efficient HVAC using natural gas; use of sky lights/natural lighting design; lighting sensors and timers for outdoor lighting; exit signs being replaced with LED models as they burn out.

Water Use and Laundry

Current Initiatives: low-flow faucet aerators and showerheads in use (older models replaced as they fail); low-flow toilets in use (older models replaced as they fail); preventive maintenance of drips and leaks; energy-efficient dryers for guest use; use of linen service providers that employ "wet" versus "dry" cleaning.

Opportunity: purchase side-by-side or stacking washing machines for laundry stations or villas that are EnergyStar compliant.

In one year, compared to a typical conventional (top loading) washing machine, an EnergyStar compliant clothes washer will save approximately

- 5,200 gallons of water, and

- 490 kWh of electricity from washer operation and water heating, and
- \$59 in energy and water costs

Maintenance and Housekeeping

Current Initiatives: preventive maintenance of all vehicles and equipment; inventory tracking so that oldest products are used first; eliminating use of aerosols; recycling of vehicle fluids and batteries (outside company used); covering, distilling, and reusing solvents in the shops; use of latex paints; reuse/donation of unused materials; effective systems of storage, labeling, and handling products; recycling: mixed paper, aluminum, cardboard, glass, plastics, grease, food waste composting, scrap metal; fuel-efficient vehicles; policy to use "dry" clean-up methods (versus using spray water).

Purchasing and Front Office

Current Initiatives: purchase of materials with recycled content (paper, benches with plastic lumber); purchase of durable/well-made products with long life; utilizing purchasing power to prescribe minimized packaging wastes (shrink-wrapping, excessive packaging) or requiring that vendors take back packaging; energy-efficient computer monitors; old computer systems donated to charity; sheets and towels that have been replaced used on site as rags and drops cloths or donated to charity.

Opportunity: purchase facial tissue, paper towels, and bath tissue with recycled content.

- Switching to a minimum 20% postconsumer content bath tissue would save 0.82 tons of virgin paper, 9.8 trees, 3,362 kWh of electricity, 5,740 gallons of water and 49.2-lbs. of air pollutants annually.
- Switching to a minimum 10% postconsumer content facial tissue would save 0.41 tons of virgin paper, 4.9 trees, 1681 kwh of electricity, 2870 gallons of water and 24.6-lbs. of air pollutants annually.

Rooms

Current Initiatives: optional towel and linen service with placards educating visitors about the program which state "Help us keep GREEN in Wintergreen;" reusable glasses/mugs provided in rooms; efficient HVAC with individual thermostats; optional free newspapers.

Foodservice and Meetings

Current Initiatives: recycling of cans/bottles; glasses, silverware, cloth napkins used for foodservice and meetings; food inventory management and bulk purchasing; kitchen grease recycling; donation of excess food.

Landscaping

Current Initiatives: use of integrated pest management, organic fertilizers and efficiently timed applications; buffer strips around all water bodies; use of native vegetation; abundance of indoor plants; wildlife habitat preservation; compost used on golf course instead of fertilizers.

Tissue Savings Calculations for Wintergreen Resort:

- Assuming 75% annual average occupancy, 300-rooms * 365-nights * 0.75 occupancy = 82,125 room nights per year.
- Assume 1-roll bath tissue consumed every 4-room nights and 1-box facial tissue consumed every 4-room nights = 20,531 rolls bath tissue and 20,531 boxes facial tissue
20,531 rolls bath tissue * 0.40 lbs./roll = 8212 lbs. = 4.1 tons of bath tissue used per year

20,531 boxes facial tissue * 0.40 lbs./box = 8212 lbs. = 4.1 tons of facial tissue used per year

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LLEWELLYN LODGE

Llewellyn Lodge is a 6-room bed and breakfast, which has been hosting guests since the 1940's. The half century old gray brick colonial is located in the old quiet residential part of the city and is a short walk from the historic district and all the local attractions, restaurants, and shops.

HVAC and Lighting

Current Initiatives: efficient but old HVAC using natural gas; use of storm windows; some compact fluorescent lighting in place.

Opportunity: replace gas furnace with a modern, more efficient model that meets or exceeds a 90% Annualized Fuel Utilization Efficiency (AFUE) energy-efficiency rating and central air conditioning unit with a minimum Seasonal Energy Efficiency Ratio (SEER) of 12.

Depending on the model selected, the replacement gas furnace can be 25-40% more efficient than the old furnace. Replacing the 10 SEER central air conditioner with a 12 SEER or higher unit will save about \$50 per year and use roughly 20% less electricity.



Water Use and Laundry

Current Initiatives: low-flow faucet aerators in all rooms; low-flow showerheads in most rooms; preventive maintenance of drips/leaks; use of linens service provider that employs "wet" versus "dry" cleaning.

Opportunity: purchase a side-by-side or stacking washing machine that is EnergyStar compliant to replace existing top loader.

In one year, compared to a typical conventional (top loading) washing machine, an EnergyStar compliant clothes washer will save approximately:

- 5,200 gallons of water, and
- 490-kWh of electricity from washer operation and water heating, and
- \$59 in energy and water costs

Maintenance and Housekeeping

Current Initiatives: preventive maintenance of all vehicles/equipment; eliminating use of aerosols; effective systems of storage, labeling, and handling products; some refillable guest amenities.

Purchasing and Front Office

Current Initiatives: purchase of durable/well-made products; 2-sided copying/printing policy, extensive use of electronic documents/records; purchasing from vendors and service providers with a commitment to the environment; utilizing purchasing power to prescribe minimized packaging wastes (shrink-wrapping, excessive packaging) or requiring that vendors take back packaging; reduced volume of regular trash through reusables and purchasing, which decreases the number of pickups.

Opportunity: purchase facial tissue, paper towels, and bath tissue with recycled content.

- Switching to a minimum 20% postconsumer content bath tissue would save 30 pounds of virgin paper, 61.5 kwh of electricity, 105 gallons of water and 1 pound of air pollutants annually.
- Switching to a minimum 10% postconsumer content facial tissue would save 15 pounds of virgin paper, 30.8 kWh of electricity, 52.5 gallons of water and 0.5 pound of air pollutants annually.

Rooms

Current Initiatives: optional linen service for multiple night guests.

Foodservice and Meetings

Current Initiatives: made-to-order food; cloth napkins for dinner guests; composting of food waste; food inventory management and bulk purchasing.

Landscaping

Current Initiatives: use of integrated pest management and organic fertilizers; buffer strips around all bodies of water.

Catch & Release Trout Stream: adhering to principles of sound environmental stewardship, riparian buffers, and no livestock encroachment.

Tissue Savings Calculations for Llewellyn Lodge:

- Assuming 1,500 room nights per year.
- Assume 1 roll bath tissue consumed every 4 room nights and 1 box facial tissue consumed every 4 room nights = 375 rolls bath tissue and 375 boxes facial tissue
375 rolls bath tissue * 0.40 lbs./roll = 150 lbs. = 0.075 tons of bath tissue used per year
375 boxes facial tissue * 0.40 lbs./box = 150 lbs. = 0.075 tons of facial tissue used per year

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THE HOTEL ROANOKE

Located in the midst of the Blue Ridge Mountains, The Hotel Roanoke & Conference Center is a 322-room vintage 1882 hotel that has been restored to its 19th-century elegance and is listed in the national Register of Historic Places.



HVAC and Lighting

Current Initiatives: energy management system for all HVAC systems; efficient HVAC using natural gas; use of skylights/natural lighting design; use of lighting sensors and high efficiency compact fluorescents; EnergyStar computers and refrigerators; use of directional lighting in parking areas and outdoors (non-dome lights that do not cause energy-wasting light pollution).

Opportunity: install interior or exterior storm windows (made of glass or Plexiglas) for all single pane windows with an estimated savings: up to 15% on heating and cooling expenditures.

Water Use and Laundry

Current Initiatives: low-flow faucet aerators and showerheads in rooms; sensors on faucets/toilets in public areas; low-flow toilets in approximately 25% of rooms; dishwashers that re-circulate water; preventive maintenance of drips/leaks; sidewalks and entryways are swept instead of hosed; water efficient washers with reuse of filter washwater; energy-efficient dryers; using proper amount of bleaches for laundry; linen segregation using gentle cycles for lightly soiled laundry.

Opportunity: replace older toilets in remaining 240-rooms with 1.6 gallons per flush models, which would yield annual savings of 249,660 gallons and \$942 dollars.

Maintenance and Housekeeping

Current Initiatives: preventive maintenance of all vehicles/equipment; inventory tracking so that oldest products are used first; eliminating use of aerosols; attempts to use less toxic materials; use of latex paints; minimizing use of HVAC/cooling tower chemicals through magnetic or ionic-flux mechanisms; reusing cooling tower water as much as possible; effective systems of storage, labeling, and handling of products; using low mercury fluorescent tube bulbs and starting to recycle the spent bulbs.

Purchasing and Front Office

Current Initiatives: purchase of recycled content paper; purchase of durable/well-made products with long life; purchase of energy-efficient equipment; policies for 2-sided copying/printing; extensive use of electronic documents/records; purchasing from vendors/service providers with commitment to the environment; utilizing purchasing power to prescribe minimized packaging wastes (shrink-wrapping, excessive packaging) or requiring that vendors take back packaging; carpets with recycled content and no-VOC's; fabrics for furniture and wallpaper with no-VOC's, use of some reused building materials; use of vintage flooring/beams, stonework, and light fixtures.

Opportunity: purchase facial tissue, paper towels, and bath tissue with recycled content.

- Switching to a minimum 20% postconsumer content bath tissue, The Hotel Roanoke would save 0.88 tons of virgin paper, 10.6 trees, 3,608 kWh of electricity, 6,160 gallons of water and 52.8 pounds of air pollutants per year.
- Switching to a minimum 10% postconsumer content facial tissue, The Hotel Roanoke would save 0.44 tons of virgin paper, 5.3 trees, 1,804 kWh of electricity, 3,080 gallons of water and 26.4 pounds of air pollutants per year.

Rooms

Current Initiatives: optional linen service for multiple night guests; reusable glasses/mugs provided in rooms; efficient HVAC with individual thermostats; optional free newspapers.

Landscaping

Current Initiatives: use of integrated pest management, organic fertilizers and efficiently timed applications; use of native vegetation; abundance of indoor plants.

Water Savings Calculation for Hotel Roanoke:

- 240-rooms with 3-½ gallons per flush toilets
- Assuming 75% average annual occupancy and two flushes per day per occupied room,
 $240\text{-rooms} \times 365\text{ nights} \times 0.75\text{ occupancy} = 65,700\text{ room nights per year} \times 2\text{ flushes @ } 3.5\text{ gallons per flush} = 459,900\text{ gallons per year}$

Replacing with 1.6 gallons per flush toilets would mean annual use of 210,240 gallons, a savings of 249,660 gallons per year, 249,660 gallons is 333 HCF (100 cubic feet of water equals 750 gallons). At \$1.21 per HCF for water and \$1.62 per HCF for sewer rates, \$942 dollars would be saved annually.

Tissue Savings Calculations for Hotel Roanoke:

- Assuming 75% annual average occupancy, $322\text{-rooms} \times 365\text{-nights} \times 0.75\text{ occupancy} = 88,147\text{ room nights per year}$.
- Assume 1-roll bath tissue consumed every 4-room nights and 1-box facial tissue consumed every 4-room nights = 22,037 rolls bath tissue and 22,037 boxes facial tissue
 $22,037\text{ rolls bath tissue} \times 0.40\text{ lbs./roll} = 8815\text{ lbs.} = 4.4\text{ tons of bath tissue used per year}$
 $22,037\text{ boxes facial tissue} \times 0.40\text{ lbs./box} = 8815\text{ lbs.} = 4.4\text{ tons of facial tissue used per year}$

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Acknowledgements



Green Seal is an independent, non-profit organization that strives to achieve a healthier and cleaner environment by identifying and promoting products and services that cause less toxic pollution and waste, conserve resources and habitats, and minimize global warming and ozone depletion. Green Seal has no financial interest in the products that it certifies or recommends nor in any manufacturer or company. Green Seal's evaluations are based on state-of-the-art science and information using internationally recognized methods and procedures. Thus, Green Seal provides credible, objective, and unbiased information whose only purpose is to direct the purchaser to environmentally responsible products and services. For more information on Green Seal, contact:

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The Virginia DEQ, through its Office of Pollution Prevention, provides free, voluntary, non-regulatory, technical assistance and materials to industry, governments, academia, non-profits and the general public on how to prevent pollution. This report was produced in conjunction with a voluntary P2 initiative targeted for the hospitality industry, entitled *Green Lodging*. For more information, please contact:

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